

## عنوان مقاله:

Investigating a novel propulsion system for unmanned aerial vehicle equipped with PEM electrolyzer, PEM fuel cell, and hydrogen and oxygen storage tanks, using photovoltaic panel as renewable energy

## محل انتشار:

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## خلاصه مقاله:

Today, for enhancing the trend of energy demand in the world, the use of energy by the approach of maximizing the efficiency of energy systems is inevitable. On the other hand, the high growth rate of unmanned aerial vehicles (UAV), governments investment to develop the necessary infrastructures for the progress of this technology, the variety of applications, and the advantages, indicate its special role in the future. In the present study, an integrated system consisting of PEM electrolyzer, PEM fuel cell, photovoltaic panel, and hydrogen and oxygen storage tanks is developed as a UAV propulsion system so that it can provide the required power. The power required by the UAV was supplied by the PEM fuel cell of the system. The intended hydrogen and oxygen are provided through a hydrogen and oxygen storage tank. In this condition, the capacity of the tanks is known as the limiting factor during the UAV flight time. For more flight continuity, part of the consumable hydrogen and oxygen during the flight is regenerated by installing a photovoltaic panel, using solar renewable energy and also PEM electrolyzer. The hydrogen and oxygen generated by the electrolyzer is ۴۹.۰۴% of the PEM fuel cell consumption, indicating that the UAV flight continuity using the integrated structure of the present study can be increased up to approximately ۱.۵ times. Then, by performing a parametric study and changing the main parameters of the system, including current densities of PEM electrolyzer and PEM fuel cell, as well as temperature and solar radiation level, the integrated system is evaluated in different conditions and the results are reported. Finally, by examining various aspects of the present plan, including the weight conditions, the efficiency of the integrated system developed in the present study as a new propulsion system for UAVs with various purposes has been specified.

## کلمات کلیدی:

PEM fuel cell, Solar photovoltaic panel, PEM electrolyzer, Unmanned aerial vehicle

## لینک ثابت مقاله در پایگاه سیویلیکا:

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